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ABSTRACT

This report investigated the effect of Kazanjian Foundation Award Programs for Teaching Economics (KFAP) on elementary school children, grades four through six. The research was designed around three groups -- users of Kazanjian materials with teacher training, without teacher training, and users of normal curriculum materials. Teacher training consisted of a five-week summer session using four randomly selected KFAP units with follow-up during the school year. Student progress was measured by pre and post instruction use of the Test of Elementary Economics and pre instruction use of the John Flanagan Test of General Ability. Teacher progress was measured by pre and post instruction use of the Test of Elementary Economics and pre instruction use of the Test of Economic Understanding (TEU). After statistical analysis, the data indicated a significant contribution to the understanding of economic concepts and practices among elementary students by Kazanjian materials. Moreover, training of the teachers gave students a comparative advantage. Teacher competency in economics measured on the TEU also contributed to improved student performance. The results reinforced continuation of the Kazanjian program and suggested the usefulness of further follow-up research. (JH)

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AN EVALUATION OF AWARD-WINNING ELEMENTARY TEACHING MATERIALS FROM THE KAZANJIAN PROGRAM

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The annual Kazanjian Foundation's Awards Program for the Teaching of Economics (hereafter designated as the KFAP) for elementary, secondary and college and university teachers was initiated in 1962.* During the first ten years of the program, approximately 400 cash prizes and honorable mention awards have been granted to elementary, secondary and college teachers throughout the United States. The KFAP has been recognized as having had a profound influence in increasing the economics content included in existing courses and programs in the schools of educators who received awards [1].

The specific purposes of the national KFAP are: (1) to stimulate improvements in teaching economics, (2) to encourage teachers to develop descriptions of their economic education teaching experiences, (3) to provide recognition for outstanding economic education teaching practices, and (4) to foster a

widening and continuing exchange of reports of successful teaching experiences in economics among teachers at every level of education [2].

Although it is probably true that the vast majority of award-winning entries do in fact contribute to students' understanding of economics, nowhere in the economic education literature have these teaching materials been systematically examined. As regards to instructional objectives, most award-winning units give specific attention and homage to such statements as "the development of a good method of thinking about economic problems and the process of orderly problem solving," or "the ability to evaluate and use both qualitative and quantitative evidence when conflicting viewpoints and approaches are encountered." Do the teaching materials in the KFAP, in fact, help teachers carry out such objectives in the instructional process?

While the purposes of the KFAP are commendable, it has not been determined, as yet, whether the award-winning entries significantly contribute to students' understanding in economics. In addition, the extent to which these materials can be effectively adapted and modified for classroom use by teachers in a variety of

school settings and with different student populations, has not been established.

THE PROBLEM

The central problem of this study was to measure the effectiveness of selected elementary award-winning teaching materials in the KFAP on students' performance in economics. Specifically, three hypotheses were examined in the investigation:

1. As measured by the Test of Elementary Economics (TEE), the mean change scores of the experimental groups who used the Kazanjian materials are not significantly different from those of the control group who did not use special materials.
2. As measured by the TEE, the mean change scores of classes taught by teachers who received in-service instruction are not significantly different from those classes taught by teachers who did not receive in-service training.
3. The correlation between the posttest scores of the teachers on the Test of Economic Understanding (TEU) and the posttest scores of their students on the TEE, is not

significantly different from zero.

DESIGN OF THE STUDY

In identifying appropriate procedures to analyze the central problem underlying the investigation, four basic steps were established and followed including (1) the selection of the control and experimental groups, (2) the selection of the Kazanjian teaching units, (3) the selection of the testing instruments, and (4) the statistical analysis of the data. Each of these steps is explained in more detail below.

Selection of Experimental and Control Groups

The research design involved twelve elementary teachers in the Sauk Rapids, Minnesota, School System and their students in grades four through six, in experimental and control groups. Two experimental groups with a total of 171 students in eight classes and one control group of 92 students in four classes were selected for the sample population. In this study design, intact classes were randomly assigned to control and experimental groups.

The eight experimental teachers and the four control teachers were similar in age, educational training, teaching experience and

school principal evaluation. All were considered good teachers, held bachelor's degrees, and had over seven years of teaching experience. Subsequent tests on selected student characteristics including socioeconomic level, age, and interest in social studies, showed no statistically significant differences between the students in the experimental and control classes.** All experimental classes and teachers used the same Kazanjian instructional materials.

The control and experimental groups established and utilized in the study may be visualized as follows:

EXPERIMENTAL		CONTROL
C_1 Use of Kazanjian teaching materials without in-service training	C_2 Materials used in C_1 plus in-service training sessions	C_3 Continue with regular social studies program
Four Teachers and Classes	Four Teachers and Classes	Four Teachers and Classes

An equal number of classes were included in the sample for each of the three groups under investigation. While students in both C_1

and C_2 treatment groups were to receive instruction based upon the same Kazanjian curriculum materials, only the four teachers in C_2 participated in a daily, five-week in-service training session during the summer of 1972 preceding the experiment. Additionally, the four teachers in C_2 met together with the principal investigator of this study for approximately two hours each month throughout the thirty-six weeks of the experiment to discuss strategies for effectively implementing the Kazanjian materials in their classrooms.

Selection of Teaching Materials

A random selection of four intermediate grade elementary teaching materials submitted to the KFAP was made from the total population of forty-nine winning entries from 1962-1971.*** All award-winning Kazanjian entries describing teaching experiences carried out by intermediate grade elementary teachers in their classrooms between July 1 and June 30 of each school year are eligible for selection. The first step in the selection process was to identify all of the individual award-winning intermediate grade elementary teaching materials. The author's name for each entry was written

on a card, and the cards were separated by school years. Each card was assigned a different identification number. A total of four entries were randomly drawn from the above school year classifications, using a table of random rumbers. The four Kazanjian teaching units selected were utilized in all experimental classes. The same sequence and time schedules for teaching each of the four instructional units were established and followed in all the experimental classes.

Selection of Testing Instruments

Teachers in both the control and experimental groups were pre- and posttested on the nationally normed and validated Test of Economic Understanding, (TEU), Form A and B [4]. For purposes of this study, the TEU was judged to be an appropriate instrument to measure the teachers' performance in economics.

The control and experimental group students in the twelve classes were pre- and posttested on the familiar Test of Elementary Economics, (TEE) [5]. The TEE contains forty multiple choice questions with four options given for each item. The test was believed to have the most potential for evaluating elementary students'

performance in economics.

In view of the necessity of using intact classes, the John Flanagan Test of General Ability (TOGA), Form A, 4-6 [6] was administered to all students in both control and experimental groups so that differences in ability levels could be determined. The TOGA yields both an IQ score and a grade expectancy score and is particularly suited as a test of general ability for elementary grade pupils.

The experiment can be summarized as follows:

GROUPS	PRETEST	TREATMENT	POSTTEST
Experimental (C_1) Four Classes	TOGA and TEE_1	Use of Kazanjian Teaching Materials Without In-Service Training (36 weeks)	TEE_2
Experimental (C_2) Four Classes	TOGA and TEE_1	Use of Kazanjian Teaching Materials With In-Service Training (36 weeks)	TEE_2
Control (C_3) Four Classes	TOGA and TEE_1	Regular Social Studies Curriculum (36 weeks)	TEE_2

Statistical Analysis of the Study Results

As Table 1 indicates, the students in the experimental classes were brighter, had more previous knowledge of economics and ended the instructional program with significantly greater knowledge in economics than did the students in the control group. Moreover, as shown in Table 2, when comparing the TEE performance of experimental students with the performance of control students by any one of two improvement measures, even greater significance in the difference was found. A t-test on the absolute improvement scores (Post TEE - Pre TEE = Δ TEE) indicated significance below the .01 level.****

Table 1

Description of Test Results Between Groups of Elementary School Students

Variables	All Students (N=263)		Experimental Group (N=171)		Control Group (N=92)		t-test Comparing Means
	Means	S.D.	Means	S.D.	Means	S.D.	
TOGA	53.51	12.34	54.67	12.67	51.37	11.42	2.07*
Pre-TEE	12.85	4.17	13.60	4.10	11.47	3.94	4.06**
Post-TEE	18.35	6.59	21.04	5.93	13.37	4.56	10.76**

* Significant at the .05 level ** Significant at the .01 level

Table 2

Post Test Score Improvement Measures

Improvement Measure	All Students (N=263)	Experimental Students (N=171)	Control Students (N=92)
Absolute (1) Improvement	5.50	7.44	1.90
Percentage (2) Improvement	42.8%	54.6%	16.5%

(1) Post TEE - Pre TEE = Δ TEE
(2) Pre TEE as the base

Unfortunately, this level of aggregation offers little explanation about the actual impact of the individual treatments on students' performance in economics. A more meaningful analysis of the data can be performed by making a comparison of the actual mean change TEE scores for classes in each treatment, adjusting these change scores to account for differences in mental ability. A one-way analysis of covariance test was employed for 12 classes, treating each class as an individual case or as the unit of sampling. For each class, the mean on TOGA was treated as the covariate and the mean change score (TEE_2 - TEE_1) was used as the criterion measure with the three treatments being materials plus in-service,

materials, and control. The results of the test are presented in Table 3.

Table 3

Results of One-Way Analysis of Covariance for Elementary School Data (N=263)

	Source of Variation		
	Between	Within	Total
Sum of Squares: Y	36.88	366.76	403.63
Sum of Squares: X	108.34	33.61	141.95
Sum of Products	62.96	37.76	25.20
Degrees of Freedom	2.00	9.00	11.00
Adjusted Sum of Squares: X	110.65	29.72	140.38
Degrees of Freedom for adjusted Sum of Squares	2.00	8.00	10.00
Variance Estimates	S_b^2=55.33	S_w^2=3.72	

$F = 55.33/3.72 = 14.89$ $p < .01$

The data reported in Table 3 indicated that the treatment effects were significant beyond the .01 level. This means that the amount of change and the effectiveness of the treatments in economics

achievement differed significantly between the experimental and the control groups. Quite clearly, almost all of the variation in the X means (mean change score on TEE) can be attributed to the influence of the treatments.

It is of interest here to calculate directly the adjusted mean change scores on the TEE. These adjusted values can be interpreted as estimates of the actual amount of change in economics performance that would have resulted if the treatment groups had equal TOGA scores. Table 4 presents these adjusted mean change values.

Table 4

Unweighted Group Means for Relevant Variables

Groups	N	Mean* TOGA	Mean* Unadjusted* Change Score ($TEE_2 - TEE_1$)	Mean* Adjusted Change Score ($TEE_2 - TEE_1$)
Experimental (C_1)	85	53.39	5.78	5.77
Experimental (C_2)	86	55.71	9.17	9.40
Control (C_3)	92	51.37	1.82	2.03

*is unweighted average of class means

As shown in Table 4, these adjusted mean change scores on

TEE vary considerably, a fact that is clearly reflected in the large F-ratio obtained in the analysis of covariance test. These results confirm that the differences between the unadjusted mean change scores on TEE are due largely to the treatments.

To obtain a more meaningful interpretation of the data reported in Table 4, a comparison of pairs of mean change scores on TEE, adjusted for TOGA, was made via t-tests. Such comparisons are used to identify pairs of means that may be significant from those that may not be. The results of the adjusted mean pair comparisons among treatment groups are presented in Table 5.

Table 5

Results of Adjusted Mean Pair Comparisons for Treatment Groups

Comparisons	Degrees of Freedom	T-value*	Significance
C_1 with C_2	6	2.35	.10
C_1 with C_3	6	2.97	.05
C_2 with C_3	6	5.77	.01

*Adjusted mean square used as the comon error term

As shown in Table 5, all three adjusted mean pair comparisons achieved significance. The comparison that achieved the greatest significance was that between groups C_2 and C_3. For this comparison, the significance level was less than .01. It may be inferred from this data that both experimental treatments were significantly more effective than was the control method, and there is an indication of superiority for the materials plus in-service treatment.

The data compiled and analyzed in the study were also fit into linear regression models. The equation for each of the models takes the familiar linear form wherein $Y = a + b_1x_1 + b_2x_2 + b_3x_3 + \ldots\ldots + b_7x_7 + e$. Post TEE, the dependent variable, is assumed to be additively and linearly related to the following independent variables:*****

x_1 = Pre TEE (0 - 40), continuous

x_2 = Post TEU (0 - 50), continuous

x_3 = TOGA (0 - 85), continuous

x_4 = Teacher's Sex (0 = male, 1 = female) dichotomous

x_5 = Years of Teaching Experience (3 - 30), continuous

x_6 = Educational Training (0 - 3, 0 = no degree), continuous

x_7 = Group Type

A (0 = Experimental C_1 and C_2, 1 = Control C_3) dichotomous

B (0 = Experimental C_2, 1 = Experimental C_1 and Control C_3) dichotomous

C (0 = Experimental C_2, 1 = Experimental C_1) dichotomous

The independent variables used in the three regression models are listed and explained in Table 6. Model I, with post TEE as the dependent variable, is run against all of the measured independent variables which the students and teachers bring into the classroom prior to instruction as well as instructional outcome variables. Group types B and C (x_7) are excluded from the independent variables in this regression equation.

Model II stipulates post TEE as the dependent variable and includes the same independent variables as Model I with the exclusion of group type A, (x_7), and adds group type B (x_7).

Model III, with post TEE as the dependent variable, includes the independent variables of Models I and II with the exception of group types A and B (x_7), and adds group type C (x_7).

Regression Model I in Table 6 confirms that the use of the Kazanjian teaching materials does contribute significantly to the economic understandings of students--as measured by TEE for students in the study population. While controlling for prior knowledge in economics (x_1) with all the other independent variables, it was found that the residual contribution of the treatment (x_7) had a

Table 6

Regression Coefficients for Models I - III
(F Ratio in Parentheses)

Independent Variables	Model I Dependent Variable Post TEE $\bar{x}$ = 18.35	Model II Dependent Variable Post TEE $\bar{x}$ = 18.35	Model III Dependent Variable Post TEE $\bar{x}$ = 18.35
x_1 Pre TEE (40 - 0) $\bar{x}$ = 12.85	.33 (22.68)**	.32 (20.28)**	.40 (20.33)**
x_2 Post TEU (50 - 0) $\bar{x}$ = 36.77	.17 (11.30)**	.31 (54.52)**	.11 (.81)
x_3 TOGA (85 - 0) $\bar{x}$ = 53.51	.16 (48.70)**	.16 (44.32)**	.16 (28.25)**
x_4 Teacher's Sex (1 = Female, 1-0) $\bar{x}$ = .56	.13 (1.01)	.15 (.98)	-1.81 (.87)
x_5 Years of Experience (12 - 1) $\bar{x}$ = 9.60	.21 (.76)	.24 (.81)	.23 (.83)
x_6 Education (1 = Bachelor's, 1 - 0) $\bar{x}$ = .92	.13 (.93)	.24 (.86)	.15 (.87)
x_7 Group A (0 = C_1 C_2, 1 = C_3) $\bar{x}$ = .35	-7.68 (48.32)**	--	--
B (0 = C_2, 1 = C_1 C_3) $\bar{x}$ = .67	--	-4.24 (40.81)**	--
C (0 = C_2, 1 = C_1) $\bar{x}$ = .50	--	--	-2.50 (20.37)**
Constant	5.72	2.30	6.92
Standard Error	3.93	3.97	4.06
Adjusted R^2	.65	.64	.55

* Significant at .05 level ** Significant at .01 level

.01 significance level for its F-value of 48.32.****** A regression coefficient of -7.68 indicated that a student loses almost seven and three-quarters points on the post TEE as a result of taking the regular social studies program as compared with taking instruction based on the use of the Kazanjian teaching materials; the experimental groups were superior in their post TEE performance.

It may be inferred from regression Models II and III in Table 6 that the students taught by teachers using the Kazanjian materials with in-service training, learned significantly more economics than did students taught by teachers without the in-service program. While holding constant prior knowledge in economics (x_1),, mental ability (x_3), and any possible differential influence of the teacher (x_2, x_4, x_5, x_6), the results of regression Model II revealed that the residual impact of the in-service treatment (x_7) was significant at the .01 level. A regression coefficient of -4.24 indicated a loss of approximately four and one-quarter points on the post TEE for a student taught by a teacher without in-service instruction. However, as regression Model III indicates, when comparing the value added on the post TEE for in-service experimental classes (C_2) as against the performance on non-in-service experimental classes

(C_1), different significance arises.

In Model III, a regression coefficient of -2.50 indicated a loss of only two and one-half points on the post TEE for a student in a non-in-service experimental class. The data suggest that the differential impact of the in-service treatment on post TEE was relatively greater when comparing the performance of the in-service classes against that of the control classes, than against the non-in-service experimental classes.

RELATIONSHIPS AMONG TEACHER VARIABLES

Table 7 gives insights into the influences of the independent teacher variables on post TEE. The results shown in this table revealed a significant correlation coefficient of .47 between the TEU_2 and the TEE_2. Regression Models I and II in Table 6 confirm the results that post TEU is significant in contributing to the students' economic understanding as measured by post TEE. Holding prior knowledge in economics constant with all other independent variables, it was found that the residual contribution of the teacher (post TEU) had a .01 significance level for its F-value in both Models I and II. In Model I, a regression coefficient of .17

indicated that for every incremental gain of one point on post TEU there is an approximate gain of .17 on post TEE, or in the students' economic understanding. Similarly, regression Model II revealed that an approximate gain of .31 on post TEE was achieved for every incremental gain of one point on post TEU.

SUMMARY OF FINDINGS

On the basis of the data compiled and analyzed in this investigation, the following findings were obtained:

1. The mean change TEE scores of the experimental groups using the Kazanjian teaching materials were significantly different from those of the control group who did not use the materials, at the .01 level.

2. The mean change TEE scores for classes taught by teachers involved in in-service training were significantly different from those classes taught by teachers without in-service training, at the .01 level.

3. The correlation between the teachers' post TEU scores and the students' post TEE scores was found to be significant at the .01 level.

Table 7

Correlations Among the Teacher Variables
(N=263)

	TEE_1	TEU_2	TOGA	Sex	Years	Education
Posttest (TEE_2)	.54	.47	.46	-.24	.03	.2
Pretest (TEE_1)		.24	.49	-.09	.03	-.11
Posttest (TEU_2)			.06	-.08	.39	-.30
TOGA				-.09	.01	.04
Teacher's Sex					.30	-.22
Years of Teaching Experience						.62
Teacher's Education						

CONCLUSIONS

As always, one is well advised to resist generalizations based upon a single case study. Yet, some tentative implications emerge.

The first and most obvious implication to be drawn from this study is that is needs to be replicated. In spite of this need and the tentativeness of the results, this study does have important implications both for the organization and teaching of elementary economics. This study has shown that the Kazanjian teaching

materials contribute significantly to elementary students' understanding of basic economic concepts and practices. Moreover, it appears as if, when teachers use the Kazanjian materials in conjunction with in-service training, the student picks up a comparative advantage in learning economics. However, inasmuch as the study revealed differential affects on students' performance between the two experimental groups and, to the extent that background on economics content is incorporated in the Kazanjian materials, the necessity for full-scale in-service economic education programs for elementary teachers is reduced.

The results of the study have shown that, while the pre TEE appears to be the best predictor of what a student will achieve on post TEE (correlation coefficient of .57), the teacher's competency in economics (as measured by post TEU) contributes significantly to the students' economic understanding. A correlation coefficient of .47 between TEE_2 and TEU_2 would indicate that there is a constant relationship between TEE and TEU--as one improves, so does the other. However, only 22 percent of the variance in TEE can be explained by using TEU as an independent variable, and it is clear from Table 6 that other variables, some acting on both measures,

some only on one measure, contribute to explaining the variability of the two measures. But, the strength of the relationship between TEE and TEU indicates that if TEU shows improvement as a result of participation in an in-service course or from the utilization of Kazanjian teaching materials, the same participation or utilization will affect the TEE score. Suggestively, in-service teaching training programs in economic education should continue to develop unique elementary curricular offerings and instructional materials designed to meet the needs of their heterogeneous clientele.

Another major implication of this study is that the Kazanjian Foundation Awards Program should continue to encourage the development and use of innovative curricular materials and instructional practices for the teaching of elementary economics. The study results suggest that the award-winning elementary materials in the KFAP can be meaningfully adapted and effectively utilized by other classroom teachers in different school settings and with different student populations. Seemingly, the elementary Kazanjian materials have some transfer utility and should be used by teachers in structuring learning experiences suited to the particular needs of their students.

Finally, it is important to reiterate that there is a differential gap in student performance gains between the experimental and control groups. Although this study could not purport to explain this significant difference solely on the basis of its model or data, it does nevertheless provide some justification for these tentative implications. In the final analysis, this study may be of greatest value, not for the questions it answered, but for the direction it suggests for future inquiry. The impact of instruction and curricular materials on students' economic understanding is a crucial problem facing educational institutions of growing influence and should be dealt with in future research.

FOOTNOTES

*Sponsored by the Calvin K. Kazanjian Foundation and administered by the Joint Council on Economic Education, the KFAP is designed to stimulate improvements in the teaching of economics at all levels of instruction. A panel of seven judges composed of recognized leaders from economics and economic education established the criteria for the awards and selected the recipients. Cash prizes and honorable mention awards are made to teachers whose entries receive award recognition. The National Depository of Kazanjian Teaching Materials is housed in the Vernon R. Alden Library at Ohio University, Athens, Ohio.

**The U.S. Office of Education guidelines for determining a school's eligibility for financial aid under Title 1 of the Elementary and Secondary Education Act (E.S.E.A.) are used as the criteria for classifying the socioeconomic level of the students in the participating schools. In addition, the Sauk Rapids School System utilizes a locally-developed instrument to determine student interest in all subject areas including social studies. See [3] for more complete statistical data and explanations of techniques of analysis used.

*** For purposes of this study, winning entries in the KFAP included all cash prize and honorable mention awards. The winning entries for an eight year period from 1962-1963 to 1970-1971 are identified in the cumulative index of Economic Education Experiences of Enterprising Teachers, Volume 9, published and distributed by the Joint Council on Economic Education.

**** Any discussion of gain added on the TEE must be qualified with the recognition that the gain-added function is clearly nonlinear. There are easy questions requiring knowledge of facts, questions of "medium" difficulty requiring comprehension of factual material, and some which are very difficult requiring application of knowledge to new situations. In fact, the test was specifically designed this way in terms of cognitive composition. It is therefore inappropriate to compare increments on this test as constructed. Only on a truly "linear test" can comparisons be safely made.

***** A number of other possible independent variables were considered for inclusion in this study. However, such other variables as the students' age, sex and family background were found to be

non-significant in similar studies [7]and/or inter-correlated with those independent variables which were identified in this study. Moreover, for purposes of generalizability, only those independent variables which were identified prior to the experiment were included in the analysis.

****** The possibility of interaction between Education and Teaching Experience was also examined by including an interaction variable ($x_5 \cdot x_6$) in a subsequent regression. The results were essentially the same as found in Model I of Table 6.

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